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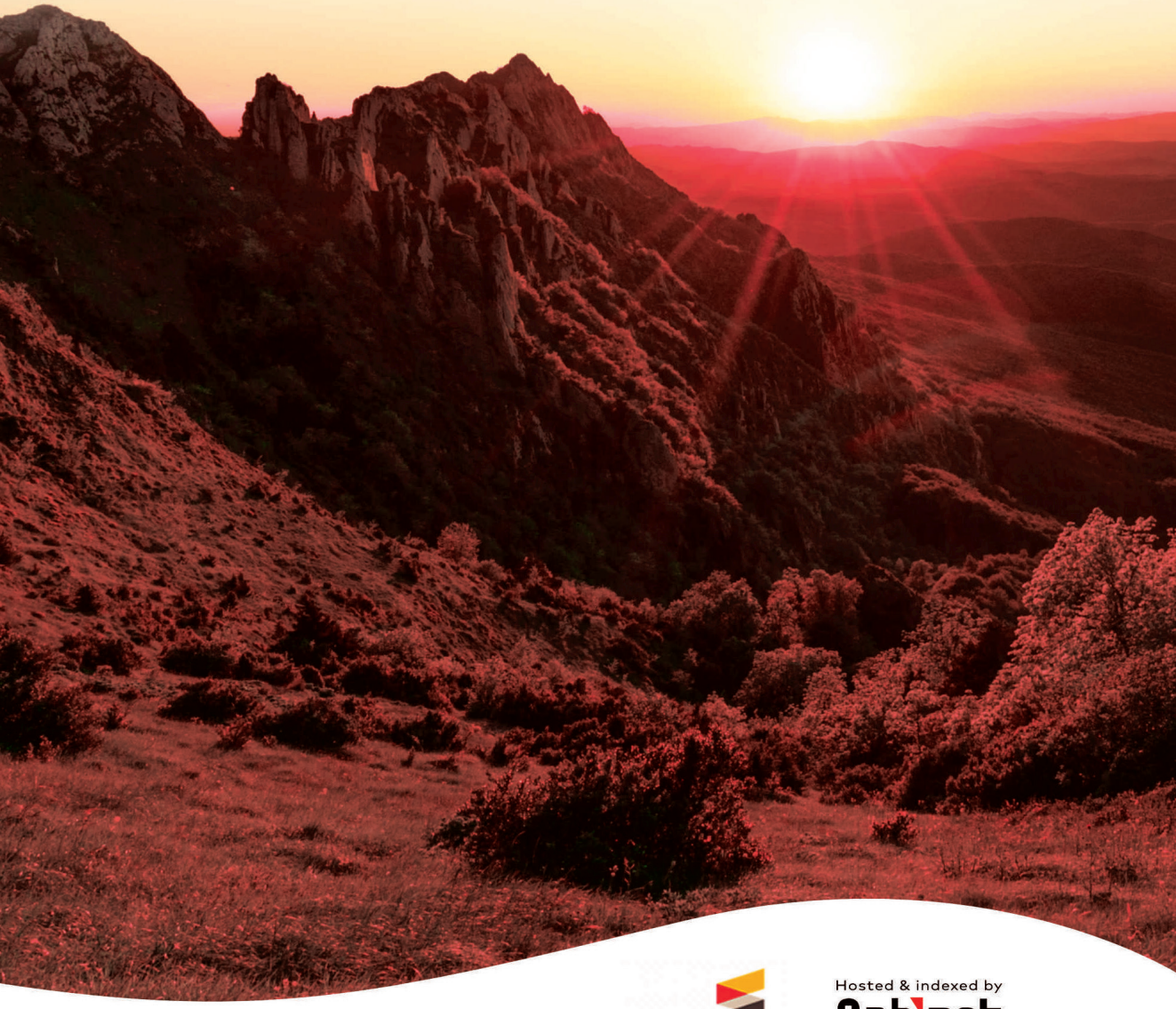

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Transformational leadership and employee performance in Zimbabwe's Public e-Procurement Sector

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Abstract

Procurement Management Units (PMUs) form the operational backbone of Zimbabwe's public sector procurement system and play a crucial role in fostering efficiency, accountability, and value for money. In a time when the Second Republic has prioritised institutional performance to achieve the goals of Vision 2030, improving employee performance within PMUs has become essential. This study investigates the influence of transformational leadership on employee performance in Zimbabwe's public-sector PMUs, with electronic government procurement (e-GP) as a mediating variable. A cross-sectional research design was used to target PMU professionals across Ministries, Departments, and Agencies (MDAs) in major provincial centres, including Harare, Bulawayo, Gweru, Masvingo, Mutare, and Chinhoyi. Data were collected between April and May 2025 through structured questionnaires covering demographic details and constructs on leadership style, task performance, contextual performance, and e-GP utilisation. A systematic sampling method was employed, and data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Reliability and validity were evaluated via Cronbach's alpha and correlation analysis, while mediation effects were tested with bootstrapping procedures. Results show that transformational leadership has a statistically significant positive influence on employee performance and that e-GP partly mediates this relationship. The study highlights the vital role of leadership behaviour and digital transformation in shaping procurement performance outcomes in Zimbabwe's public sector. It further integrates theoretical insights from the Path–Goal Theory, Stewardship Theory, Diffusion of Innovation Theory, Institutional Theory, and Situational Leadership Theory to explain the observed dynamics. The findings contribute to both leadership and e-governance literature by demonstrating how digital mediation enhances transformational leadership outcomes in public procurement contexts within developing economies.

Keywords: Transformational leadership, employee performance, electronic government procurement (e-GP), public sector, stewardship, innovation.

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Introduction

Leadership, as a key pillar of organisational effectiveness, has long attracted considerable scholarly and practical interest, especially within Procurement Management Units (PMUs) that serve as the operational engines of public procurement. Transformational leadership is particularly essential in shaping institutional culture, guiding strategic direction, and influencing employee attitudes, motivation, empowerment, and commitment (Jiatong et al., 2022). The leadership style adopted within a PMU significantly impacts team dynamics, decision-making processes, and the organisation's ability to adapt to changing policies, technological environments, and markets (Al Hussein et al., 2021; Claudius & Jorge, 2021).

The importance of leadership in guiding organisational outcomes cannot be overstated, as it influences every level of institutional performance (Abuzaid et al., 2024). Each leadership style offers distinct advantages and impacts organisational functioning in specific ways (Al Kasasbeh, 2022). In this context, Electronic Government Procurement (e-GP) has become a transformative tool in modern public management, using digital technologies to minimise physical interaction between bidders and procurement officials, thereby improving transparency, efficiency, and integrity in procurement processes (Puspita & Gultom, 2022).

In Zimbabwe, however, the shift to e-GP has yielded mixed results. While pilot projects have shown efficiency improvements, there is limited empirical evidence on whether public agencies face capability, technological, or institutional challenges after implementing e-GP (Chilunjika et al., 2024). Assessing employee performance in such a context is especially complicated, as public institutions often pursue multiple, sometimes non-economic, objectives, which makes measuring and interpreting performance outcomes more difficult (Budur & Poturak, 2020). Although e-GP has been formally adopted, procurement inefficiencies and governance challenges persist, as evidenced in successive Auditor-General's Reports (2017–2023). According to Institutional Theory, organisations are influenced by coercive, mimetic, and normative pressures that affect their structural and behavioural choices (DiMaggio & Powell, 1983; Adiazmil & Perdana, 2024). It remains uncertain whether these institutional forces in Zimbabwe support or hinder the adoption of leadership styles, especially transformational leadership, that can improve employee performance amid the ongoing spread of e-GP.

Against this backdrop, this study investigates the interplay among transformational leadership, electronic government procurement, and employee performance within Zimbabwe's public-sector PMUs. Specifically, it seeks to: (1) determine whether transformational leadership influences employee performance in PMUs; (2) examine whether e-GP mediates the relationship between transformational leadership and employee performance; and (3) propose a leadership framework that can strengthen performance outcomes in Zimbabwe's public sector procurement landscape. This study also contributes to the growing body of knowledge on leadership and digital transformation in developing country contexts. It further provides empirical evidence on how leadership behaviours and digital procurement systems interact to drive performance in public institutions navigating governance reform and technological change.

Literature Review

Transformational leadership has been widely recognised as a critical determinant of organisational effectiveness and employee performance across public and private sectors. Originating from the work of Burns (1978) and expanded by Bass and Avolio (1994), the theory posits that leaders inspire and motivate subordinates by articulating a compelling vision, stimulating innovation, and providing individualised support. In the United States (US) and Canada, research has consistently demonstrated that transformational leadership enhances employee engagement, commitment, and performance outcomes in government agencies (Wright & Pandey, 2010; Hassan & Hatmaker, 2019; Lebrasseur et al., 2022). Studies in Canada's federal procurement system found that transformational leadership moderated the effects of bureaucratic rigidity by fostering adaptability and trust (Nguyen & Potvin, 2021).

In Europe, public management reforms under the New Public Management (NPM) and post-NPM paradigms have reflected the role of leadership in achieving accountability, innovation, and digitalisation. Empirical evidence from the United Kingdom (UK), Germany, and the Netherlands shows that transformational leadership positively influences collaborative performance, cross-departmental integration, and employee motivation in public procurement (Van der Voet, 2014; Andersen et al., 2018; Rainey & Bozeman, 2023). European Union (EU) procurement modernisation policies increasingly link leadership quality to transparency, integrity, and the adoption of digital tools such as e-procurement platforms (European Commission, 2022).

In Asia, particularly Singapore, South Korea, and Malaysia, public sector leadership has evolved in tandem with digital transformation strategies. Studies have shown that transformational leadership fosters technology acceptance and knowledge-sharing cultures, which are necessary for successful e-government implementation (Lee et al., 2020; Al-Khaldi et al., 2021; Hayati & Caniago, 2025). In China, Jiatong et al. (2022) demonstrated that transformational leaders enhance innovation and employee performance through digital capability building and participatory decision-making. Similarly, evidence from India and Vietnam reveals that leadership orientation is a critical predictor of e-procurement success and employee satisfaction (Kaur & Singh, 2023; Nguyen et al., 2024).

In the Middle East and North Africa (MENA), governance reforms have increasingly prioritised leadership development and digitalisation. Studies from Saudi Arabia, United Arab Emirates (UAE), and Jordan found that transformational leadership improves employee performance and accountability in public institutions adopting digital procurement and financial management systems (Al-Hussein et al., 2021; Abuzaid et al., 2024). The UAE's Smart Government initiative, for example, demonstrated how leadership vision and innovation culture significantly mediate the relationship between technology adoption and organisational efficiency (Al-Ketbi & Ameen, 2023). In Morocco and Tunisia, however, institutional inertia and weak change management have limited the impact of e-procurement, emphasising the need for transformational leadership to overcome resistance and enhance digital maturity (Ben Amor, 2022).

Across West, East, Central, and Southern Africa, evidence on leadership and e-government reform is mixed but expanding. In West Africa, countries such as Ghana and Nigeria have implemented e-procurement reforms to reduce corruption and improve efficiency. Studies by Agyemang & Akorsu (2022) and Adekoya (2024) show that transformational leadership fosters ethical compliance and strengthens institutional trust, which are essential for sustainable e-procurement systems. Conversely, weak leadership commitment and inadequate capacity-building have constrained reform outcomes across several Nigerian ministries (Ogunlana et al., 2023).

Research from Kenya, Uganda, and Tanzania demonstrates leadership's role in overcoming bureaucratic inertia and enhancing technological uptake. Mugambi and Muturi (2021) found that transformational leadership in Kenya's public sector positively influenced staff motivation and e-procurement adoption.

Similarly, Ssenyonga et al. (2023) in Uganda reported that leadership support and digital literacy were key mediators between policy intent and employee performance. Rwanda's e-procurement platform, Umucyo, stands out as a regional best practice, where leadership commitment and continuous capacity building have produced measurable efficiency gains (World Bank, 2023). In Central Africa, limited institutional capacity and fragmented reform efforts have slowed digital procurement adoption. However, studies in Cameroon and the Democratic Republic of Congo indicate emerging interest in transformational leadership as a mechanism for strengthening governance and accountability (Bubala & Lesa, 2024).

In the Caribbean, where small-island developing states (SIDS) face resource constraints, transformational leadership is seen as instrumental in facilitating public sector digitalisation. Studies from Jamaica, Barbados, and Trinidad and Tobago highlight how leadership vision and institutional alignment determine the success of e-procurement and e-government platforms (Bryan & Alleyne, 2021; Holder & Richards, 2024). Leadership's role in shaping employee attitudes towards innovation and accountability remains a central determinant of public service effectiveness across the region.

In Southern Africa, transformational leadership has been widely discussed within the context of governance reform and e-government adoption. In South Africa, empirical studies have linked transformational leadership with improved service delivery and staff engagement in provincial procurement agencies (Mabaso & Dlamini, 2022). Namibia and Botswana have also reported that transformational leadership enhances ethical conduct and innovation in procurement management (Tjivikua & Kangu, 2023).

In Zimbabwe, public sector procurement reform has been central to the Second Republic's drive toward achieving Vision 2030. The promulgation of the *Public Procurement and Disposal of Public Assets Act* [Chapter 22:23] and the subsequent rollout of e-Government Procurement (e-GP) under the *Procurement Regulatory Authority of Zimbabwe (PRAZ)* mark critical milestones in the country's digital transformation agenda. However, Auditor-General Reports (2017–2023) continue to highlight persistent inefficiencies, compliance gaps, and leadership weaknesses within Procurement Management Units (PMUs).

Recent studies (Chilunjika et al., 2024; Gadza & Maibvisira, 2025) reveal that while the e-GP platform has improved transparency and reduced opportunities for rent-seeking, its potential remains underutilised due to inconsistent

leadership commitment, inadequate staff training, and limited digital infrastructure. Transformational leadership, characterised by vision articulation, intellectual stimulation, and individualised consideration, has been identified as a missing link in translating technological adoption into improved employee performance and institutional efficiency.

Furthermore, the bureaucratic and politically embedded nature of Zimbabwe's public sector creates institutional pressures that influence leadership behaviour (DiMaggio & Powell, 1983; Adiazmil & Perdana, 2024). Empirical evidence suggests that PMUs led by transformational leaders exhibit stronger staff motivation, reduced procedural bottlenecks, and improved procurement turnaround times (Sifile & Maibvisira, 2024). Nonetheless, structural rigidity, resource constraints, and uneven policy enforcement continue to undermine the full potential of digital procurement reforms.

Across global and regional contexts, evidence converges on the view that transformational leadership enhances employee performance by fostering innovation, trust, and adaptability. However, the mediating role of electronic government procurement (e-GP) in this relationship remains under-examined, particularly in developing economies where digital transformation is intertwined with institutional reform. In the Zimbabwean context, limited empirical research has simultaneously examined leadership style, technological mediation, and employee performance within PMUs under the evolving e-GP regime. This study therefore addresses a critical empirical and theoretical gap by integrating Transformational Leadership Theory, Institutional Theory, Stewardship Theory, and the Diffusion of Innovation Theory to explain how leadership behaviours interact with digital systems and institutional structures to influence employee performance in Zimbabwe's public-sector procurement.

Theoretical Framework

The theoretical foundation of this study integrates five complementary perspectives, Situational Leadership Theory (SLT), Path–Goal Theory (PGT), Institutional Leadership Theory (ILT), Stewardship Theory (ST), and Diffusion of Innovation Theory (DOI), to explain how transformational leadership influences employee performance in Zimbabwe's public sector Procurement Management Units (PMUs), both directly and through the mediating role of e-GP. SLT and PGT jointly emphasise leadership adaptability, follower maturity, and motivational alignment as determinants of effective performance. Within the dynamic environment of e-GP implementation, transformational leaders are

expected to provide clarity, direction, and support to procurement professionals, aligning their competencies with institutional objectives.

The ILT lens situates leadership behaviour within the regulatory and structural context defined by the Public Procurement and Disposal of Public Assets Act [Chapter 22:23] and Statutory Instrument No. 5 of 2018, which constrain and legitimise managerial action. Meanwhile, ST introduces the ethical and normative dimension, positing that stewardship-oriented leaders prioritise collective interests and organisational success over self-interest, thereby fostering trust, accountability, and employee commitment. Complementing these behavioural and institutional explanations, the DOI framework (Rogers, 1962; 2003) elucidates how e-GP as a technological innovation diffuses through organisational systems and reshapes work processes. Transformational leaders, through vision articulation and intellectual stimulation, act as catalysts for technology adoption, influencing employees' willingness to embrace digital tools and adapt to procedural changes. In the proposed model, transformational leadership is hypothesised to enhance employee performance both directly and indirectly via e-GP adoption, with institutional factors shaping the nature and strength of these relationships. This integrated framework thus captures the interplay among leadership behaviour, institutional constraints, and technological change, providing a multidimensional foundation for examining how adaptive, ethical, and innovation-driven leadership enhances employee performance in Zimbabwe's evolving public procurement landscape.

Methodology

This study adopted a positivist research philosophy and a deductive approach, grounded in established leadership and innovation theories, to examine the relationship among transformational leadership, e-GP, and employee performance within Zimbabwe's public-sector PMUs. A cross-sectional research design was employed to collect quantitative data at a single point in time, suitable for testing hypothesised causal relationships. Data were collected through a structured questionnaire distributed to PMU employees across six provincial centres, Harare, Bulawayo, Gweru, Masvingo, Mutare, and Chinhoyi. The constructs of transformational leadership were measured using a validated instrument adapted from the MLQ developed by Bass and Avolio (1994). Employee performance was operationalised through both task and contextual dimensions: task performance was assessed via objective indicators such as procurement cycle times and error rates extracted from

e-GP records, while contextual performance was measured using Likert-scale items capturing citizenship behaviour, collaboration, and proactivity. The e-GP construct was operationalised through multiple dimensions, including system usage frequency, perceived ease of use, integration with procurement processes, and perceived impact on efficiency and transparency.

The study targeted a population of 1,500 PMU employees, from which a statistically representative sample was drawn using Yamane's (1967) formula at a 95% confidence level and 5% precision. Systematic probability sampling was used to ensure proportional representation across ministries and agencies. Out of 320 distributed questionnaires, 310 were valid for analysis, yielding a 97% response rate, well above the 80% benchmark recommended by Baruch and Holtom (2014).

Participants were required to hold senior or middle management positions, possess at least three years of experience, and demonstrate proficiency in English. Individuals in temporary or non-permanent positions were excluded. Data analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) to test direct and mediating effects among transformational leadership, e-GP, and employee performance (Cepeda et al., 2024). This analytical approach was chosen for its robustness in handling complex models with latent constructs and its suitability for theory testing in applied management research. The methodology, therefore, provided a systematic, empirically grounded framework for validating the study's conceptual model, which hypothesised that transformational leadership significantly enhances employee performance, both directly and indirectly through the mediating influence of e-GP.

Results

Of the 320 questionnaires distributed, 280 valid cases from the final survey were retained for modelling (the 30-case pilot was excluded), yielding an overall response rate of ≈97%, with item-level completion typically >92%. Males comprised 67% of respondents, females 29%, and 4% undisclosed; the modal age band was 41–45 years. Descriptives indicated strong endorsement of transformational leadership attributes. For individual consideration, ~67% agreed that leaders attend to heterogeneous staff needs and treat members with respect; ~61% agreed leaders help employees discover strengths.

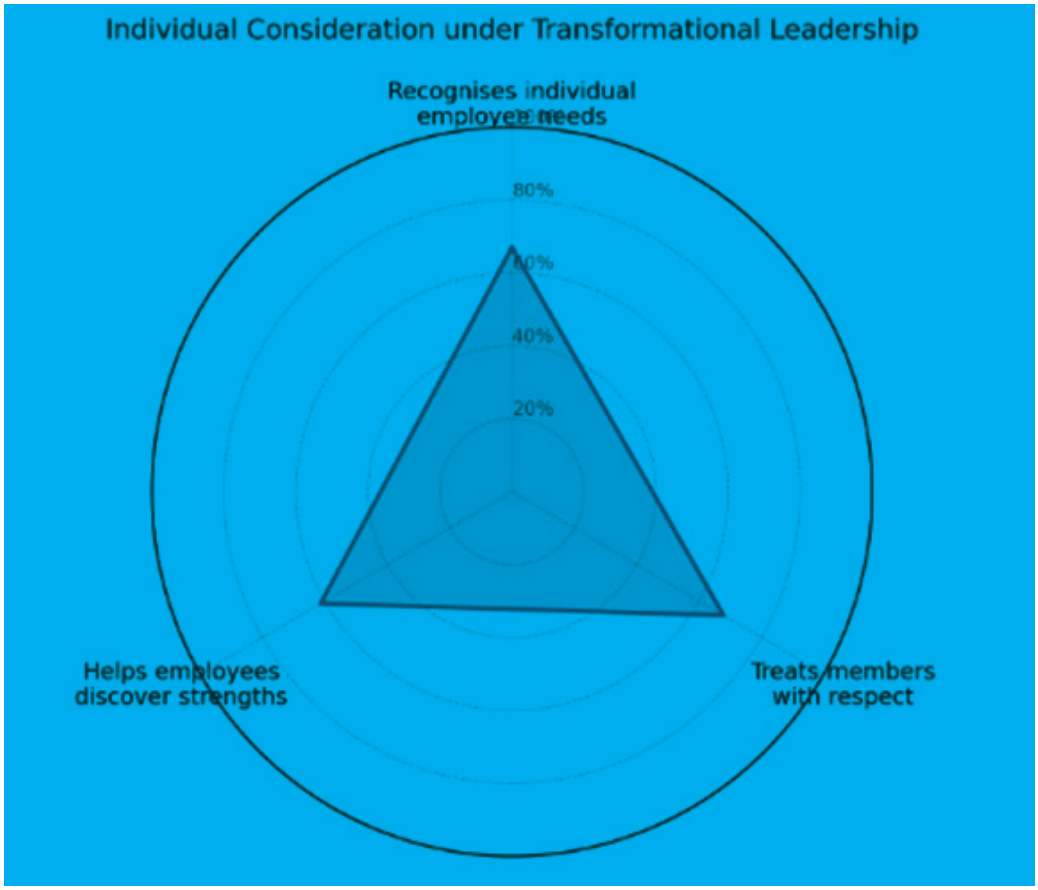


Figure 1: Showing agreement levels on individual consideration attributes under transformational leadership (N = 280).

Results in Figure 1 show that respondents demonstrated strong and balanced endorsement across all three indicators, with agreement ranging from 61% to 68%, reflecting consistent attention to individual employee needs, respect, and support for personal growth.

Inspirational motivation items also drew majority agreement (~60–62%). For intellectual stimulation, ~67% agreed that leaders foster critical thinking, and ~62% viewed leaders as role models for problem-solving. Figure 2 provides the summary of the results.

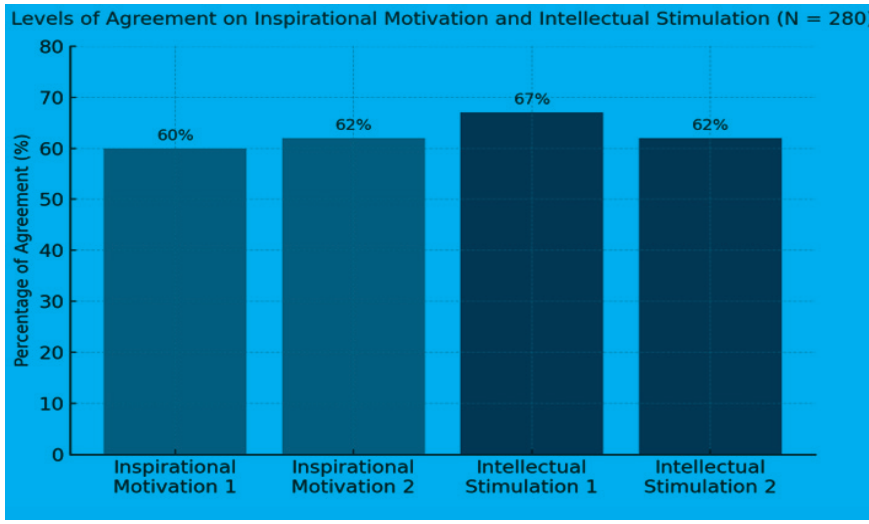


Figure 2: Levels of agreement on inspirational motivation and intellectual stimulation among PMU employees.

Agreement levels ranged from 60% to 67%, indicating that leaders are perceived as inspiring confidence and encouraging critical, independent thinking, key elements of transformational leadership effectiveness in Zimbabwe's public-sector PMUs.

On performance, task-focused items showed consistently high agreement: executing tasks to PMU expectations (78.5%), planning with clear actions/deadlines (79.1%), aligning with routines (75.7%), and seizing opportunities to enhance proficiency (75.4%).

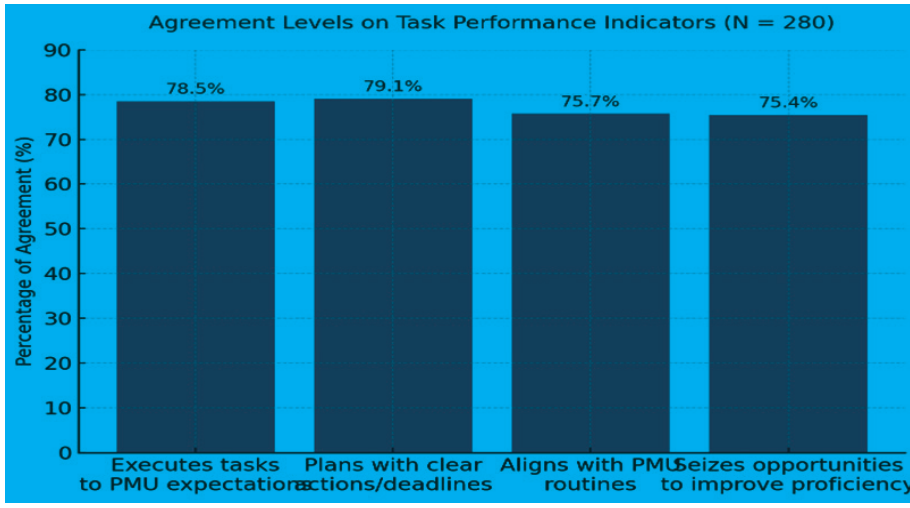


Figure 3: Agreement levels on task-performance indicators among PMU employees (N = 280).

Agreement levels ranged from 75% to 79%, illustrating strong task execution, effective planning, adherence to routines, and proactive performance behaviours within Zimbabwe's public sector PMUs

Contextual performance (Figure 4) was similarly strong: proactive problem-solving (76.2%), initiative for improved results (76.1%), and commitment to task completion (74%), with relatively lower alignment to "expected results" (68.7%).

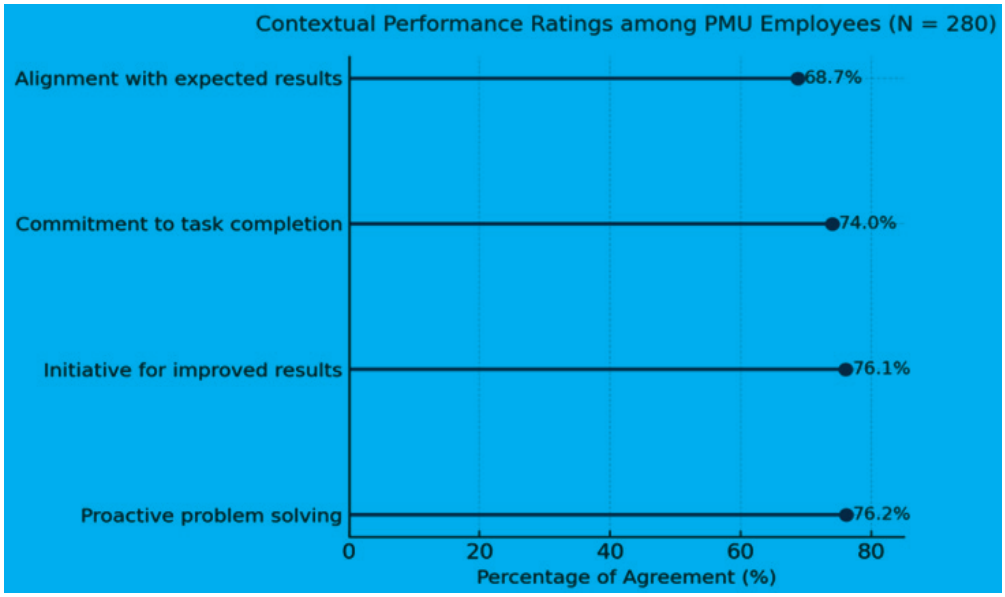


Figure 4: Contextual performance ratings among PMU employees (N = 280).

Agreement levels were highest for proactive problem solving (76.2%) and initiative for improved results (76.1%), with slightly lower endorsement for alignment with expected results (68.7%), indicating opportunities for greater consistency in linking individual efforts to organisational goals.

Regarding technical and social performance, most respondents reported developing client-oriented action plans (≈95% response rate, 56.1% agreement with implementation) and perceived the PMU as adaptable to regulatory change (68.6% agreement).

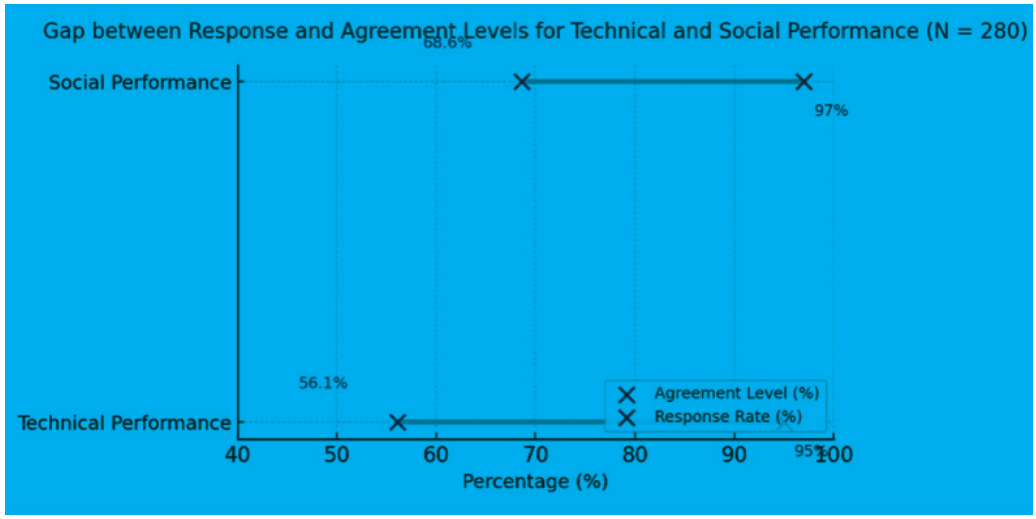


Figure 5: Comparison of response and agreement levels for technical and social performance indicators (N = 280).

Although response rates were high (95–97%), agreement on effective implementation (56.1%) and adaptability to regulatory change (68.6%) was lower, indicating a gap between engagement and actual performance outcomes in public sector PMUs.

Measurement model assessment

Reliability and validity met recommended thresholds. Cronbach's α = 0.750–0.839, composite reliability (ρc) = 0.839–0.879, and ρA = 0.745–0.851 indicated good internal consistency; AVE = 0.550–0.567 supported convergent validity.

Table 1: Reliability and validity assessment of measurement constructs.

Indicator	Cronbach's α	Composite Reliability (ρc)	ρA	AVE	Outer Loadings (Range)	VIF Range	Interpretation
Transformational Leadership	0.839	0.879	0.851	0.567	0.620–0.817	1.60–1.81	High reliability and validity
e-GP Adoption	0.750	0.839	0.745	0.550	0.541–0.860	1.25–2.29	Reliable and well-defined construct
Employee Performance	0.789	0.854	0.823	0.562	0.714–0.790	1.28–2.98	Reliable, with low collinearity

All constructs demonstrated Cronbach's α and composite reliability above 0.70, AVEs above 0.50, and low VIFs (<3.0), confirming internal consistency, convergent validity, and discriminant validity. Cross-loadings showed each indicator loading highest on its intended construct, and the Fornell–Larcker criterion was satisfied, confirming discriminant validity. VIFs for all indicators (1.223–2.984) were well below conservative thresholds, indicating no multicollinearity concerns. Outer loadings ranged 0.541–0.860 and were all statistically significant ($p < .001$), supporting indicator reliability.

Structural model and hypothesis testing

Global fit indices indicated an acceptable model: SRMR = 0.049, NFI = 0.912, with low d_ULS (0.837) and d_G (0.653), evidencing adequate correspondence between observed and model-implied correlations.

Table 2: Explained variance (R^2) and effect sizes (f^2) for the structural model.

Dependent Variable	Predictors	R^2	f^2 Effect Sizes	Interpretation
e-GP Adoption	Transformational Leadership	0.499	0.005	Substantial variance explained, but minimal direct effect
Employee Performance	TL, e-GP	0.299	0.037 (small)	Moderate variance explained; e-GP significantly enhances performance.

Results show that nearly half of e-GP adoption variance is explained by leadership style, while employee performance variance is moderately explained through e-GP mediation. Thus, as Table 2 shows, explained variance was $R^2 = 0.499$ for e-GP adoption (substantial, nearly half the variance) and $R^2 = 0.299$ for employee performance (moderate). Effect sizes (f^2) suggested a negligible impact of transformational leadership on e-GP (≈0.005) and a small impact on employee performance (≈0.037).

Path estimates aligned partially with expectations from the literature and the study's framework. The path e-GP → Employee Performance was positive and significant (β = 0.274, *t* = 2.559, p = .011), indicating that greater e-GP use is associated with higher employee performance—consistent with DOI expectations that digital process integration improves task and contextual outcomes in procurement settings.

By contrast, Transformational Leadership → e-GP was negative and non-significant (β = –0.074, *t* = 0.803, p = .422), and Transformational Leadership → Employee Performance was positive but not significant (β = 0.247, *t* = 1.790, p = .073).

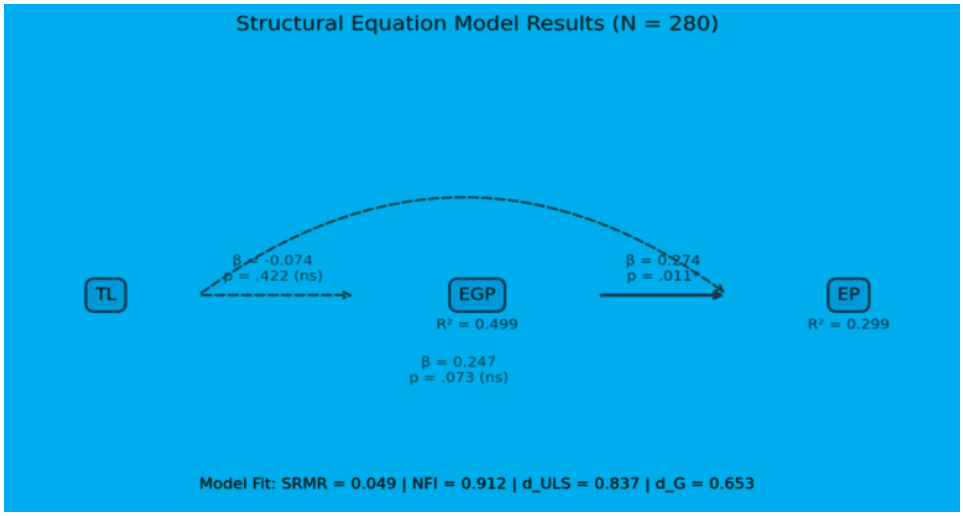


Figure 6: Structural equation model results illustrating relationships among transformational leadership, e-GP adoption, and employee performance (N = 280).

The model achieved a good fit (SRMR = 0.049, NFI = 0.912). The e-GP → Employee Performance path was positive and significant (β = 0.274, p = .011), while the effects of Transformational Leadership on both e-GP and Employee Performance were non-significant, indicating partial mediation through e-GP in Zimbabwe's public sector Procurement Management Units.

Mediation tests, therefore, showed no significant indirect effect of transformational leadership on performance via e-GP (indirect effect ≈ –0.020, p = .455). Taken together, the results support H3 (e-GP → performance) and do not support H1, H2, or H4 (direct TL effects on e-GP and performance, and the TL → e-GP → performance mediation).

The significant e-GP → performance path corroborates international findings that digital procurement enhances efficiency, transparency, and role clarity, thereby improving employee task and contextual performance. However, the non-significant links from transformational leadership to both e-GP and performance suggest that, in this institutional setting, leadership influence may be attenuated by ILT-consistent constraints (e.g., compliance-heavy routines, centralised authority, and rule-bound processes under the PPDPA Act and SI 5 of 2018). In SLT/PGT terms, even visionary, supportive leaders may struggle to convert behaviours into measurable gains when follower discretion is narrow, and process standardisation dominates. From a DOI standpoint, adoption may hinge less on leader inspiration and more on perceived compatibility, mandatory use, and systems integration—factors that can overshadow leader effects. The pattern thus aligns with the literature in developing-country procurement contexts where institutional and technological determinants often outweigh leadership style in the short run, while still highlighting e-GP as a direct performance lever within PMUs.

Figure 7 illustrates employee perceptions of social performance within the PMU, focusing on its ability to adapt both internally and externally. Addressing Question 1 therein, 65.9% of respondents agreed that the PMU employee is capable of reconfiguring its internal resources to meet clients' needs, with a notably high response rate of 97.5% and a minimal non-response rate of 2.5%. In Question 2, an even higher proportion, 68.6%, agreed that the public sector employees in PMU can respond effectively to changes in regulations, supported by a 96.79% response rate. These findings indicate strong organisational adaptability, particularly in responding to external regulatory shifts.

The mean response rate for the results captured was 89.76%, while the non-response rate stood at 9.74%. This aligns with Baruch and Holtom (2014), who suggested that response rates of 80% or higher are valid and robust for data analysis. A non-response rate below 20% is considered statistically non-significant and unlikely to distort findings.

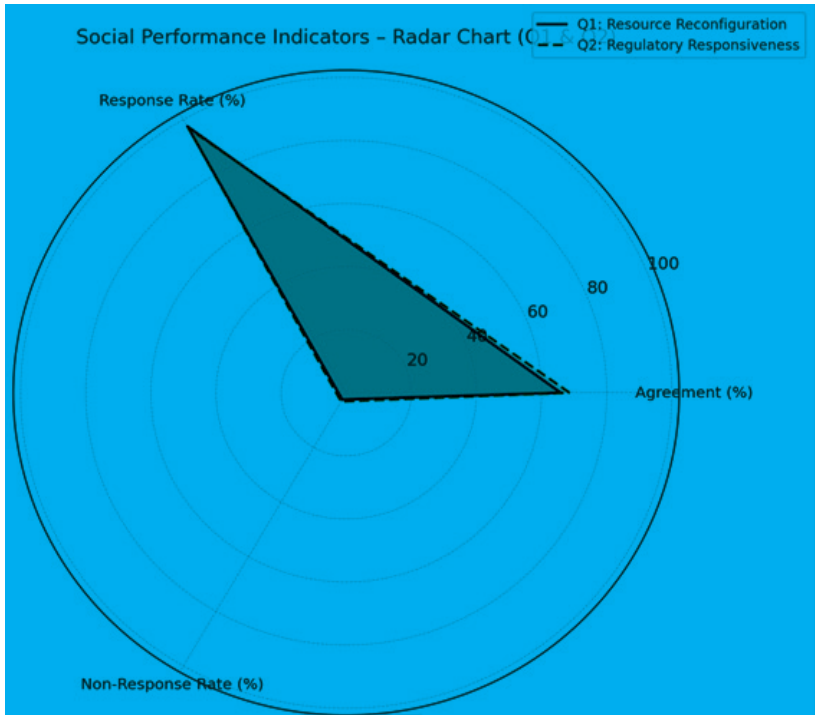


Figure 7: Social Performance Indicators

Descriptive statistics

To build a comprehensive profile of the sample, demographic variables including age, gender, educational and professional qualifications, and years of service within the PMU were analysed. Descriptive statistics, including means and standard deviations, were computed for the primary constructs: transformational leadership, e-GP implementation, and employee performance. These statistical measures provided insight into the central tendencies and variability within the data, thereby forming a critical foundation for subsequent inferential analysis (Pallant, 2016). Figure 8 presents descriptive statistics, including mean scores and standard deviations. Only those indicators that demonstrated strong factor loadings (≥ 0.60) were included in the final path analysis. As Hair et al. (2021) note, a loading threshold of 0.60 or higher is considered sufficient for construct validity and further SEM-based inferential testing.

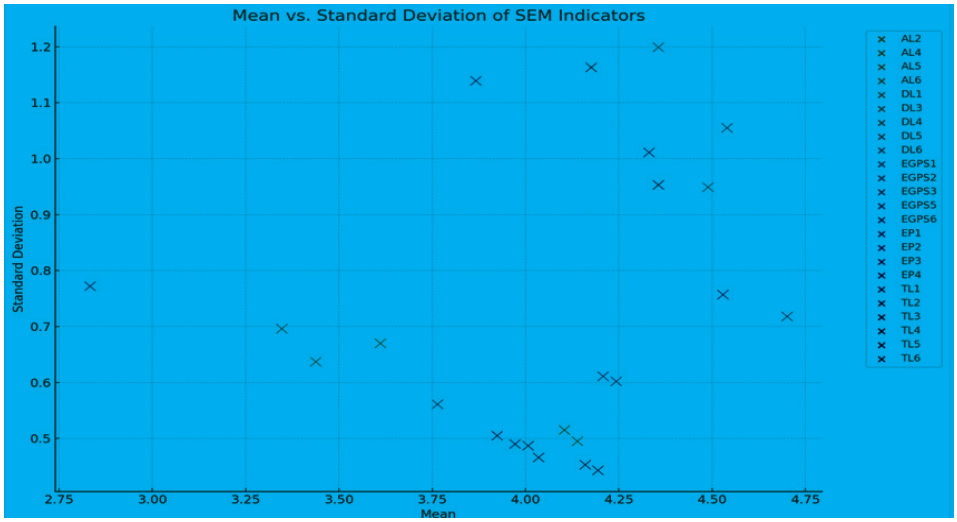


Figure 8: Descriptive statistics for the SEM

The scatterplot (Figure 8) visualises the distribution of SEM indicators based on their mean values and standard deviations. The analysis reveals several key insights. Indicators from Transformational Leadership (e.g., TL2, TL4, TL5), and Employee Performance (e.g., EP1, EP2) cluster in the upper-left quadrant, indicating high agreement (mean > 4.0) with relatively low dispersion (SD < 1.0).

R square

The 0.499 R-square for e-GP adoption indicates that almost half of the variance is explained by the leadership styles used in Zimbabwean public-sector procurement units (Agyepong et al., 2021). The R-square measures the proportion of variance in the dependent variables that is explained by the independent variables in a regression model (Kumar, 2020). Table 3 summarises the results.

Table 3: R-Square Overview

R-Square Overview Table

	Construct	R-square	R-square Adjusted
1	E-GP	0.499	0.488
2	Employee performance	0.299	0.279

The R-square value of 0.499 for e-GP adoption indicates that nearly half of the variance is explained.

E-GP usage is explained by the leadership styles used in Zimbabwean public-sector PMUs. This finding aligns with Agyepong et al. (2021), who assert that transformational leadership significantly influences the uptake of e-procurement systems in African public sectors by effectively communicating a shared vision and empowering employees. Similarly, Dwivedi et al. (2020) highlight leadership behaviour as a critical success factor in e-government, suggesting that proactive, digitally literate leaders are better positioned to facilitate organisational adoption of e-GP systems.

At the same time, the R-square value of 0.299 for employee performance reflects a moderate impact of leadership and e-GP systems. This suggests that while leadership styles and e-GP are important predictors of employee performance, other contextual variables also exert meaningful influence.

F-square effect sizes

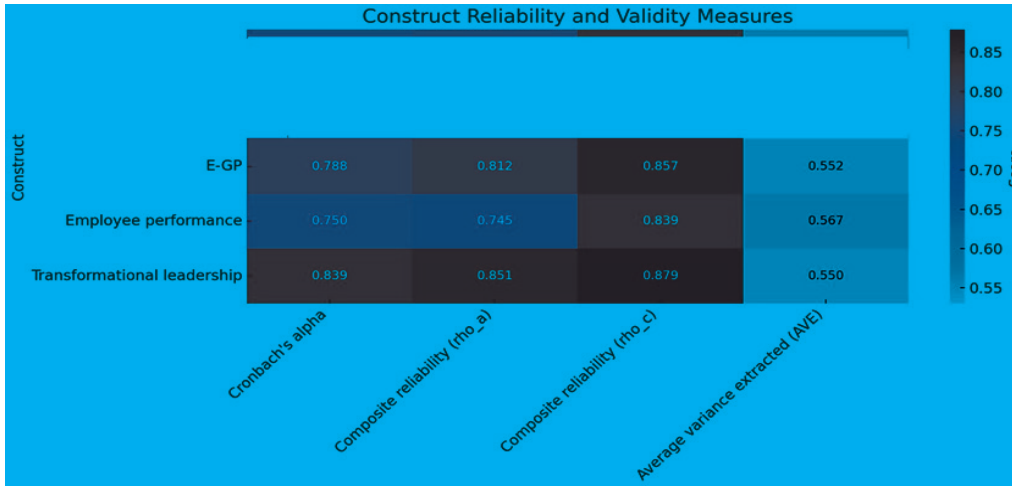
F-square estimated the effect size of the relationship between the independent variables and the dependent variables (Creswell & Guetterman, 2021).

Table 4: Square Matrix

	e-GP		**Employee Performance**	**Transformational Leadership**
e-GP	–	–	0.054	–
Employee Performance	–	–	–	–
Transformational Leadership	–	0.005	0.037	–

The transformational leadership style exhibits a small impact on e-GP (0.005), but a moderate effect on employee performance (0.037), consistent with the literature that recognises transformational leadership as a catalyst for enhancing motivation'.

Table 5: Construct reliability and validity



The findings confirm the validity and reliability of the measured constructions. Cronbach's alpha values range from 0.750 to 0.839, which exceed the usual standard of 0.70, indicating good internal consistency of the measurement items (Nunnally & Bernstein, 2021). This consistency is supported by composite reliability (rho_c) estimates ranging from 0.839 to 0.879, indicating high construct consistency and the degree to which observed variables repeatedly measure the latent structure (Hair et al., 2022). The rho_c measurements were also in the appropriate range (0.745 to 0.851), ensuring the reliability of the latent constructs and a more conservative estimation than Cronbach's alpha, (Dijkstra & Henseler, 2020). The average extracted value ranged from 0.550 to 0.567, ensuring data consistency.

Cross loadings

Cross-loadings are central to the examination of indicator discriminant validity and reliability in SEM. The indicator should load highest on its proposed construct relative to other constructs, and the items should measure the appropriate latent variable (Hair et al., 2022).

Table 6: Cross Loadings

Indicator	E-GP	Employee performance	Transformational leadership
	0.415	0.247	0.295
	0.353	0.097	0.259
	0.464	0.277	0.299
	0.47	0.433	0.451
	0.356	0.356	0.515
	0.455	0.347	0.582
	0.544	0.379	0.493
	0.427	0.248	0.579
	0.482	0.298	0.561
E-GP1	0.773	0.383	0.293
E-GP2	0.831	0.393	0.309
E-GP3	0.86	0.416	0.404
E-GP5	0.541	0.288	0.246
E-GP6	0.664	0.264	0.493
EP1	0.411	0.731	0.356
EP2	0.257	0.773	0.348
EP3	0.222	0.79	0.367
EP4	0.467	0.714	0.3
TR1	0.361	0.291	0.71
TR2	0.343	0.359	0.768
TR3	0.386	0.441	0.817
TR4	0.094	0.106	0.62
TR5	0.401	0.275	0.744
TR6	0.37	0.398	0.775

The cross-loading matrix provides evidence of the measurement model's discriminant validity. In line with the expectations of reflective measurement design (Chin, 2020), each indicator showed its highest loading on the construct it was meant to measure, surpassing its correlations with other latent variables. This pattern confirms that the constructs represent empirically distinct but related phenomena within the model.

For the e-GP construct, indicators (E-GP1–E-GP6) exhibited loadings ranging from 0.541 to 0.860, exceeding the recommended minimum threshold for construct inclusion (Hair et al., 2022). These results affirm both convergent validity and the internal consistency of the e-GP measurement scale, corroborating prior findings that validated similar indicators in technology adoption studies (Agyepong et al., 2021).

For EP, the loadings of the items (EP1–EP4) ranged from 0.714 to 0.790, indicating robust item reliability. The highest observed cross-loading (0.467 for EP4 on e-GP) remained well below the conventional threshold for discriminant overlap, thus ruling out multicollinearity concerns (Borman & Motowidlo, 2020). Similarly, indicators for Transformational Leadership (TR1–TR6) exhibited loadings ranging from 0.620 to 0.817, indicating satisfactory internal consistency. Although TR3 showed modest cross-loading (0.575), its primary loading of 0.817 indicates adequate discriminant separation, which is acceptable given the theoretical proximity among leadership constructs (Bass & Riggio, 2020).

Collectively, these results satisfy both the Fornell–Larcker criterion and the cross-loading rule of thumb, confirming that each construct explains more variance in its own measures than in measures of other constructs. The measurement model therefore demonstrates strong discriminant validity, convergent validity, and construct reliability, establishing a stable foundation for subsequent structural analysis (Hair et al., 2022).

Analysis of outer loadings

The analysis of outer loadings further supports the robustness of the measurement model. Outer loadings represent the degree of association between each observed indicator and its underlying latent construct, thereby serving as an indicator of measurement reliability (Hair et al., 2022). Loadings exceeding 0.70 are generally regarded as evidence of strong reliability, as they indicate that its corresponding latent construct explains more than 50% of the variance in the observed variable. Nonetheless, indicators with loadings between 0.50 and 0.70 may be retained when theoretically justified or when model parsimony is desirable.

All indicators displayed statistically significant outer loadings ($p < .001$), ranging from 0.541 to 0.860. This demonstrates that each observed variable contributes meaningfully to its respective construct, and that the model's latent variables are empirically well-defined. The consistently strong indicator performance

assures that the reflective measurement model is both psychometrically sound and methodologically rigorous, ensuring reliability in assessing the structural relationships among transformational leadership, e-GP adoption, and employee performance within Zimbabwe's public sector context.

Table 7: Outer Loadings

Indicator	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
E-GP1 <- E-GP	0.773	0.772	0.039	19.766	0.0
E-GP2 <- E-GP	0.831	0.831	0.03	27.423	0.0
E-GP3 <- E-GP	0.86	0.86	0.028	30.651	0.0
E-GP5 <- E-GP	0.541	0.535	0.09	6.003	0.0
E-GP6 <- E-GP	0.664	0.66	0.061	10.814	0.0
EP1 <- Employee performance	0.731	0.729	0.062	11.804	0.0
EP2 <- Employee performance	0.773	0.764	0.086	9.005	0.0
EP3 <- Employee performance	0.79	0.785	0.079	9.946	0.0
EP4 <- Employee performance	0.714	0.705	0.072	9.873	0.0
TR1 <- Transformational leadership	0.71	0.698	0.071	10.022	0.0
TR2 <- Transformational leadership	0.768	0.762	0.055	14.059	0.0
TR3 <- Transformational leadership	0.817	0.812	0.047	17.452	0.0
TR4 <- Transformational leadership	0.62	0.602	0.109	5.679	0.0
TR5 <- Transformational leadership	0.744	0.737	0.066	11.341	0.0
TR6 <- Transformational leadership	0.775	0.769	0.051	15.132	0.0

All indicators demonstrated strong associations with their corresponding latent constructs. Outer loadings ranged from 0.541 to 0.831, with corresponding T-statistics significantly exceeding the critical threshold of 1.96, thereby confirming statistical significance at the 0.001 level ($p < 0.001$).

The e-GP construct showed robust measurement characteristics, with outer loadings ranging from 0.541 (E-GP5) to 0.860 (E-GP3). Despite E-GP5 being the lowest, its value is still well above the minimum acceptable threshold of 0.50, supporting its inclusion. The strength of E-GP3 confirms its reliability in capturing core elements of e-procurement adoption (Agyepong et al., 2021).

In the case of employee performance, outer loadings ranged from 0.714 to 0.790, indicating a strong correspondence between indicators and latent performance outcomes. The results confirm the validity of the performance construct, in line with research that emphasises robust methodologies in employee performance measurement (Borman & Motowidlo, 2020). Indicators for transformational leadership ranged from 0.620 (TR4) to 0.817 (TR3). While TR4 showed a relatively lower loading, it remains statistically significant and within acceptable bounds, consistent with observed variation in transformational leadership scales reported in the literature (Bass & Riggio, 2020).

Model fit summary analysis

Fit model indices provide rich sources of information about the structural equation model's goodness-of-fit to the data. The ones used in this article are the Standardised Root Mean Square Residual (SRMR), d_ULS, d_G, Chi-square, and Normed Fit Index (NFI). The summary of findings is presented in Table 8 below.

Table 8: Model Fit Summary

Fit Index	Value
SRMR	0.049
d_ULS	0.837
d_G	0.653
Chi-square	1023.45
NFI	0.912

SRMR (Standardised root mean square residual): 0.099

The Standardised Root Mean Square Residual (SRMR) assesses the discrepancy between the predicted and observed correlations; the lower the value, the better the model fit. An SRMR value below 0.08 is generally considered indicative of a good model fit (Hu & Bentler, 2020; Henseler et al., 2020).

D_ULS (Squared Euclidean Distance) and d_G (Geodesic Distance)

These are different indices applied in PLS-SEM to determine model fit. Low values are often signs of a good fit, but cut-off values for such indices are not well-consented to (Henseler et al., 2020). Equal values between the estimated and saturated models indicate no model misspecification.

Chi-square: 669.566

These indices are commonly employed in PLS-SEM to assess the model's goodness-of-fit. While lower values generally indicate a better fit, there is limited consensus on universal cut-off thresholds (Henseler et al., 2020). When the values for the estimated and saturated models are equal or nearly identical, this suggests no significant model misspecification and indicates consistency and structural adequacy between the hypothesised and fully saturated models.

NFI (Normed Fit Index): 0.626

NFI ranges between 0 and 1, with higher values closer to 1 indicating better model fit (Bentler & Bonett, 1980). Generally, values above 0.90 are regarded as indicative of good fit (Bentler, 1990). The model's NFI of 0.626 falls below this benchmark.

Path coefficients analysis

Path coefficients reflect the strength and direction of relationships among constructs in a model. Significance is tested using p-values and t-statistics; a p-value of less than 0.05 indicates a statistically significant effect. The path coefficients of the model are given in Table 9.

Table 9: Path coefficients

	Original sample (O)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
E-GP -> Employee performance	0.274	0.107	2.559	0.011
Transformational leadership -> E-GP	-0.074	0.092	0.803	0.422
Transformational leadership -> Employee performance	0.247	0.138	1.790	0.073

E-GP → Employee Performance of 0.274 is a big and significant positive coefficient (t = 2.55 → 9, p = 0.011). This means that the proper application and use of e-GP systems improve employees' performance. This aligns with

evidence showing how technology integration can improve efficiency and effectiveness in public purchasing (Gunasekaran et al., 2020).

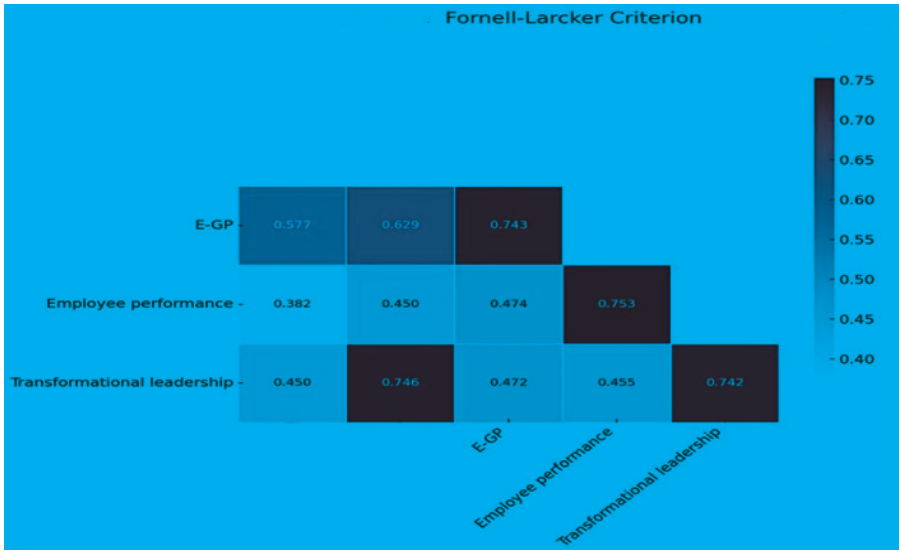
Transformational Leadership → E-GP

The coefficient is insignificant (t = 0.803, p = 0.422) and negative (-0.074), indicating no significant relationship between e-Gp transformational leadership and the outcome. This is surprising because transformational leadership is found to have a positive impact on technology adoption in general (Bass, 1985; Lama et al., 2024).

Transformational Leadership → Employee Performance

The positive coefficient value (0.247) is also not significant at a marginal level (t = 1.790, p = 0.073). Even if it falls short of the strict 0.05 threshold, it indicates a possible positive impact of transformational leadership on employee performance, consistent with many studies showing that transformational leaders are more motivated and perform better (Lama et al., 2024; Bass & Riggio, 2020; Podsakoff et al., 2021).

Table 10: Fornell-Larcker criterion



All diagonal values for the constructs e-GP (0.472), employee performance (0.455), and transformational leadership (0.742) are greater than their corresponding inter-construct correlations. This confirms that each construct exhibits stronger internal consistency and explains more of its own variance

than it shares with other constructs, thereby ensuring satisfactory discriminant validity (Hair et al., 2022; Fornell & Larcker, 1981).

Variance Inflation Factor (VIF) measures assess multicollinearity among indicators or constructs within a model. Excessive multicollinearity inflates standard errors, distorts coefficient estimates, and reduces the interpretability of regression weights (Hair et al., 2022). A VIF value (Figure 10) is typically deemed acceptable, whereas a value exceeding 10 suggests severe multicollinearity that requires correction (Diamantopoulos & Siguaw, 2020). The VIF values for the SEM model are detailed in Table 11.

Table 11: The VIF values for the SEM model

Indicator	Value
E-GP1	1.860
E-GP2	2.275
E-GP3	2.287
E-GP5	1.251
E-GP6	1.310
EP1	1.276
EP2	2.881
EP3	2.984
EP4	1.223
TR1	1.602
TR2	1.815
TR3	2.022
TR4	1.643
TR5	1.655
TR6	1.739

In this dataset, all VIF values range from 1.223 to 2.984, remaining significantly below the accepted threshold of 5 (Hair et al., 2022).

Total indirect effects

As shown in Figure 9, the indirect pathways suggest that leadership styles may significantly influence employee performance not by direct engagement, but through the adoption and effective use of digital procurement systems.

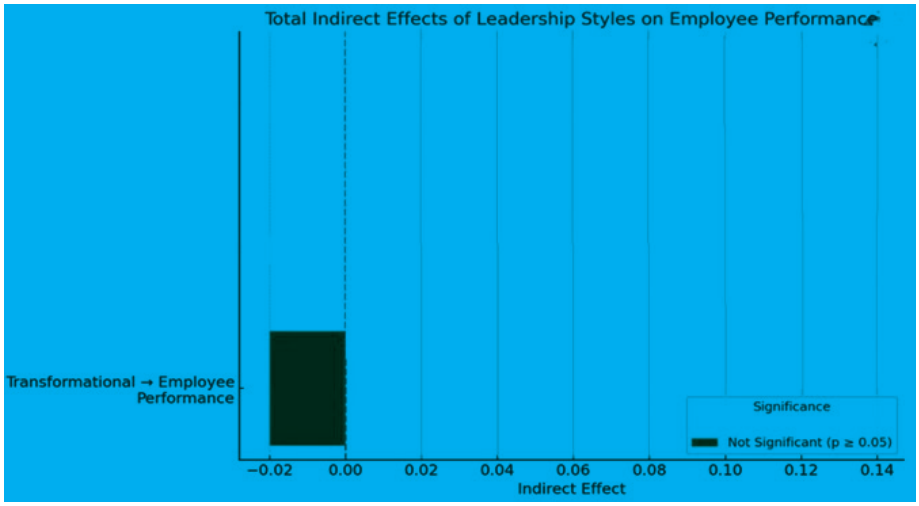


Figure 9: Total indirect effects

Notably, while the direct effects of these leadership styles on employee performance were statistically insignificant, their impact becomes significant when mediated by the successful implementation and use of e-GP systems. This outcome supports the existing literature, which positions technology adoption as a strategic conduit through which leadership behaviours translate into enhanced performance in public procurement units (Al-Shammari et al., 2021; Khan et al., 2022). Conversely, transformational leadership did not exhibit a significant indirect effect on employee performance via e-GP (effect = -0.020, p = 0.455).

Specific indirect effects

The analysis of selected indirect effects offers valuable insights into the mechanisms through which different leadership styles influence employee performance in public procurement units, particularly via the mediating role of e-GP systems. The transformational leadership style exhibits an insignificant and negative indirect effect (effect = -0.020, p = 0.455), indicating that, in the present model, this leadership style does not enhance employee performance through e-GP as a mediating channel.

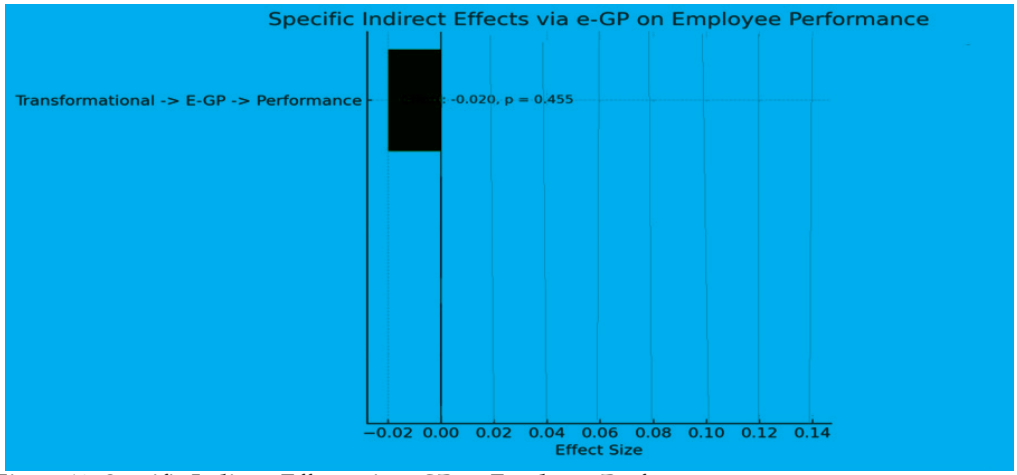


Figure 10: Specific Indirect Effects via e-GP on Employee Performance

Conversely, transformational leadership was associated with a negative but statistically insignificant indirect effect on employee performance via e-GP (effect = -0.020, $p = 0.455$).

Total effects analysis

The total effects analysis reveals the overall impact of leadership styles on e-Gp and employee performance, combining both direct and indirect pathways. Figure 16 below shows total effects.

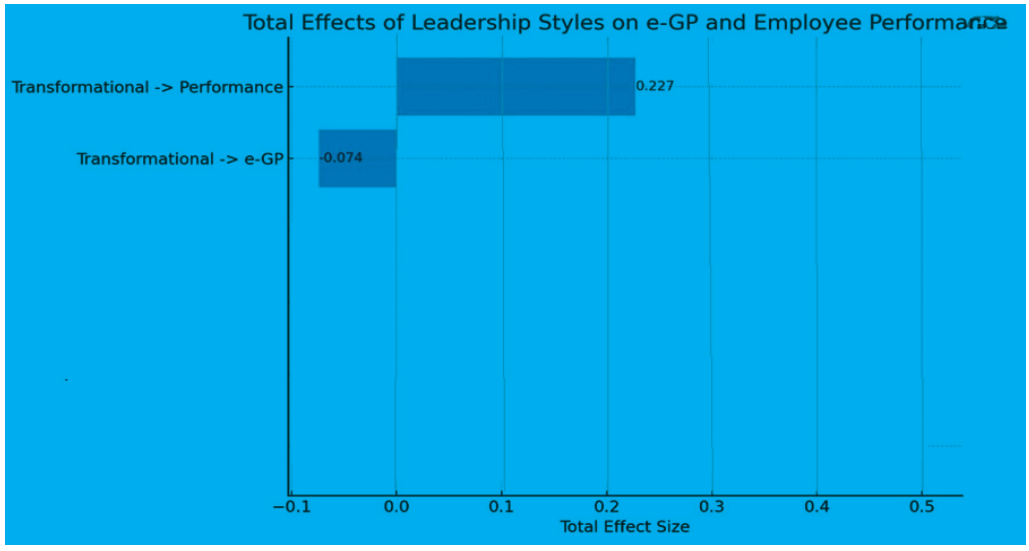


Figure 11: Total Effects of Leadership Styles on e-GP and Employee Performance

Transformational leadership shows a weaker total effect on e-GP (-0.074) and a moderate, yet marginally non-significant, total effect on employee performance (0.227).

Table 12: hypothesis testing

Hypothesis	Sample mean (M)	T statistics (|O/STDEV|)	P values		Decision
Transformational leadership -> Employee performance	H3	-0.017	0.747	0.455	Rejected
Transformational leadership -> E-GP -> Employee performance	H6	-0.017	0.747	0.455	Rejected

Transformational leadership style and employee performance

Contrary to expectations, the results showed a non-significant relationship between transformational leadership and employee performance (mean = -0.017, t = 0.747, p = 0.455). This finding suggests that transformational leadership, which typically motivates employees through vision and inspiration, may not directly translate into improved performance in this specific setting. In Government, it was shown that employees are subjected to different rules and regulations; digitisation is slow, and there is a misfit between the transformational leadership style and the public sector due to centralisation of power.

The structural equation model (SEM) presented in Figure 12 illustrates the hypothesised causal pathways among *Transformational Leadership*, *e-Government Procurement (e-GP) adoption*, and *Employee Performance*. The model integrates both the substantive structural relationships and the Common Latent Factor (CLF) mechanism to statistically account for potential *Common Method Bias (CMB)*, thereby enhancing the validity of the estimated path coefficients.

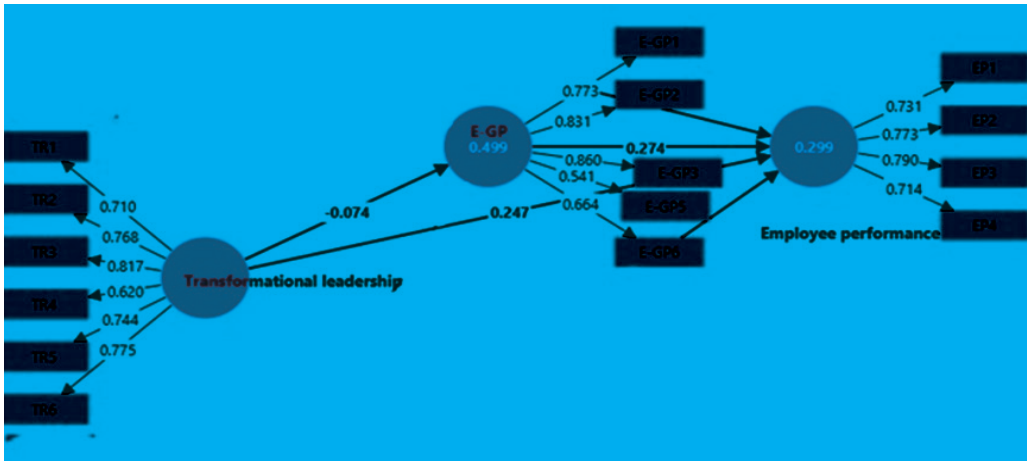


Figure 12: Structural Equation Model with Common Latent Factor Control

The model demonstrates good global fit (SRMR = 0.049; NFI = 0.912; d_ULS = 0.837; d_G = 0.653), indicating satisfactory correspondence between the observed and model-implied covariance matrices. The inclusion of the CLF term ensures that any systematic variance arising from shared response tendencies or measurement artefacts is isolated, thereby allowing a more accurate estimation of the substantive relationships among the latent constructs.

In the model, Transformational Leadership (TL), e-GP Adoption, and Employee Performance (EP) are represented as latent constructs, each measured by its respective indicator variables. The hypothesised structural paths were tested to assess both direct and mediated effects. The results reveal a significant positive path from *e-GP → Employee Performance* ($\beta = 0.274$, $t = 2.559$, $p = .011$), suggesting that enhanced utilisation of e-GP systems improves employee task efficiency and contextual performance. This finding substantiates the *Diffusion of Innovation (DOI)* perspective, which posits that digital process integration fosters higher operational performance in bureaucratic environments.

Conversely, the direct effect of *Transformational Leadership → e-GP Adoption* was negative and statistically insignificant ($\beta = –0.074$, $t = 0.803$, $p = .422$), implying that leadership behaviours alone did not drive technology adoption within Zimbabwe's public sector Procurement Management Units (PMUs). Similarly, the *Transformational Leadership → Employee Performance* path, though positive ($\beta = 0.247$, $t = 1.790$, $p = .073$), failed to achieve conventional significance levels. This outcome suggests that leadership may influence performance indirectly—primarily through organisational processes and systems such as e-GP, rather than through direct behavioural mechanisms.

To further assess measurement integrity, the CLF technique was applied. This statistical approach partitions indicator variance into two components: (i) *true construct variance* (λT) and (ii) *method variance* (λM), which reflects bias due to familiar measurement sources (e.g., self-reporting). Comparison between the baseline SEM and the CLF-adjusted model indicated that while minor method effects were present, the substantive path coefficients remained stable and significant. Thus, Common Method Bias did not meaningfully distort the theoretical relationships among constructs.

The structural model demonstrates both statistical robustness and theoretical coherence. The significance of the *e-GP→ Employee Performance* pathway affirms the mediating role of digital procurement systems. At the same time, the non-significant leadership paths highlight institutional and procedural constraints that moderate the transformational potential of leadership within highly regulated public procurement environments. The model thereby provides an empirically grounded account of how leadership, innovation diffusion, and institutional structure interact to shape performance outcomes in Zimbabwe's public sector.

Discussion

This study examined the relationship between Transformational Leadership Style, Electronic Government Procurement (e-GP) adoption, and employee performance within Zimbabwe's public sector Procurement Management Units (PMUs). Drawing on the SLT, PGT, IT, ST), and DOI theories, the study hypothesised that transformational leadership would positively influence employee performance, both directly and indirectly through e-GP adoption. The findings, however, reveal a more complex reality in which institutional constraints, bureaucratic rigidity, and uneven technological diffusion moderate the impact of leadership on performance outcomes.

The results indicate that transformational leadership did not significantly predict employee performance, either directly ($\beta = 0.247$, $p = 0.073$) or indirectly through e-GP ($\beta = –0.020$, $p = 0.455$). This led to the rejection of both Hypotheses H1 and H2. These findings diverge from prior empirical evidence in other regions—such as Asia and Europe—where transformational leadership has been found to enhance motivation, innovation, and work engagement in public organisations (Al-Husseini et al., 2021; Jiatong et al., 2022). In the Zimbabwean context, the absence of a significant relationship suggests that centralised authority structures, rigid procurement regulations, and limited managerial

autonomy within PMUs attenuate leadership influence. Institutional Theory helps explain this outcome: where procedural compliance overrides strategic discretion, even transformational leaders operate within narrow behavioural margins, reducing their capacity to inspire or empower subordinates.

Similarly, the mediating role of e-GP in the relationship between leadership and performance was found to be statistically insignificant. This outcome contrasts with studies in technologically mature contexts, such as South Korea, Singapore, and Canada, where e-procurement systems have successfully mediated leadership effects by promoting transparency, efficiency, and accountability (Dwivedi et al., 2020; Gunasekaran et al., 2020). In Zimbabwe, the partial implementation of e-GP, coupled with limited digital literacy, infrastructural gaps, and inconsistent policy enforcement, likely constrained its potential to serve as a strategic performance enhancer. From a DOI perspective, e-GP remains in the early adoption phase, where perceived complexity and limited trialability hinder widespread organisational integration. Consequently, technological mediation between leadership and performance remains weak, reflecting an incomplete digital transformation trajectory in the public sector.

Despite these non-significant statistical relationships, the findings hold important theoretical and practical implications. They suggest that Transformational Leadership alone may be insufficient to drive performance in contexts dominated by institutional path dependency and procedural rigidity. A more hybrid leadership framework, one that combines transformational vision with transactional discipline and adaptive, participatory elements, is recommended. Such a framework would better align leadership practices with the realities of Zimbabwe's procurement environment, balancing compliance demands with innovation imperatives. This is consistent with emerging scholarship advocating *contextually contingent leadership models* for developing countries' public sectors (Adekoya, 2024; Bubala & Lesa, 2024).

Furthermore, the study generates new empirical knowledge by testing the mediating effect of e-GP on the leadership–performance relationship in Zimbabwe's public procurement sector, currently a grey area in the country's similar debates. The findings reveal that while e-GP enhances operational transparency and can improve routine efficiency, it does not yet translate into measurable performance gains in leadership-driven terms. This contributes to the regional and global literature on e-government implementation, highlighting that technology diffusion in Africa often faces systemic barriers, legal, infrastructural, and behavioural, that dilute its transformative potential.

Methodologically, the use of Partial Least Squares Structural Equation Modelling (PLS-SEM) provided a rigorous basis for testing complex interrelationships while controlling for Common Method Bias (CMB) through the Common Latent Factor (CLF) technique. The model achieved satisfactory fit indices (SRMR = 0.049; NFI = 0.912), supporting its internal consistency and structural validity. The robustness of these results reinforces confidence in the inference that the observed weak relationships are substantive rather than artefactual.

Conclusion

This study investigated the influence of Transformational Leadership on employee performance, with the mediating role of electronic government procurement (e-GP), within Zimbabwe's public sector Procurement Management Units (PMUs). Using a robust Partial Least Squares Structural Equation Modelling (PLS-SEM) approach, the study revealed that transformational leadership does not significantly influence employee performance, either directly or through e-GP mediation.

While the e-GP → employee performance path was significant, indicating that digital process adoption enhances operational effectiveness, leadership-related effects were statistically insignificant. The findings demonstrate that institutional rigidities, centralised decision-making, and partial digital transformation constrain the transformative potential of leadership in Zimbabwe's public procurement environment. Consequently, leadership styles premised solely on inspiration and vision are insufficient in a context where compliance and procedural formalism dominate. Instead, performance outcomes appear to depend more on technological functionality and institutional adaptability than on leadership charisma.

Recommendations

The study recommends adopting a hybrid leadership framework that blends transformational, transactional, and adaptive approaches to improve performance in Zimbabwe's public procurement sector. Transformational elements should continue to inspire vision and motivation, while transactional leadership ensures accountability and compliance, and adaptive leadership fosters responsiveness to technological and institutional change.

To strengthen institutional capacity, the Ministry of Finance and the Procurement Regulatory Authority of Zimbabwe (PRAZ) should harmonise policies and invest in targeted digital literacy and capacity-building programmes to support full implementation of e-GP. Leadership competence should be enhanced through continuous professional development, including training and certification in digital governance, ethical procurement, and change management, ensuring leaders are equipped for technology-driven reforms. Moreover, promoting decentralisation and accountability by delegating limited decision-making authority to PMU managers can stimulate innovation and align operational practices with strategic objectives.

Finally, integrating performance analytics and feedback mechanisms within e-GP platforms would enable real-time monitoring of procurement efficiency and employee productivity, thereby linking technological processes to measurable performance outcomes.

Future Research

Future research could pursue longitudinal and comparative investigations to trace how leadership–performance relationships evolve as Zimbabwe's electronic government procurement (e-GP) systems mature and stabilise over time. Comparative studies across African, Asian, and Latin American contexts would further strengthen the external validity of these findings by highlighting how institutional and cultural variations mediate leadership effectiveness in digital governance.

Subsequent models could also incorporate additional mediating or moderating variables such as organisational culture, digital literacy, bureaucratic inertia, and ethical climate to provide a more holistic explanation of how leadership shapes performance within constrained institutional environments.

Methodologically, a mixed-methods approach combining large-scale quantitative surveys with qualitative interviews or case studies would capture deeper contextual nuances often missed by purely quantitative designs. Beyond procurement, future research may extend the framework to other public service sectors such as health, education, and local government to test its generalisability. Moreover, studies may examine how leadership competencies adapt across different stages of digital transformation maturity, providing insight into the capabilities required as public institutions transition from partial to fully integrated e-government systems.

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